

FIG.1

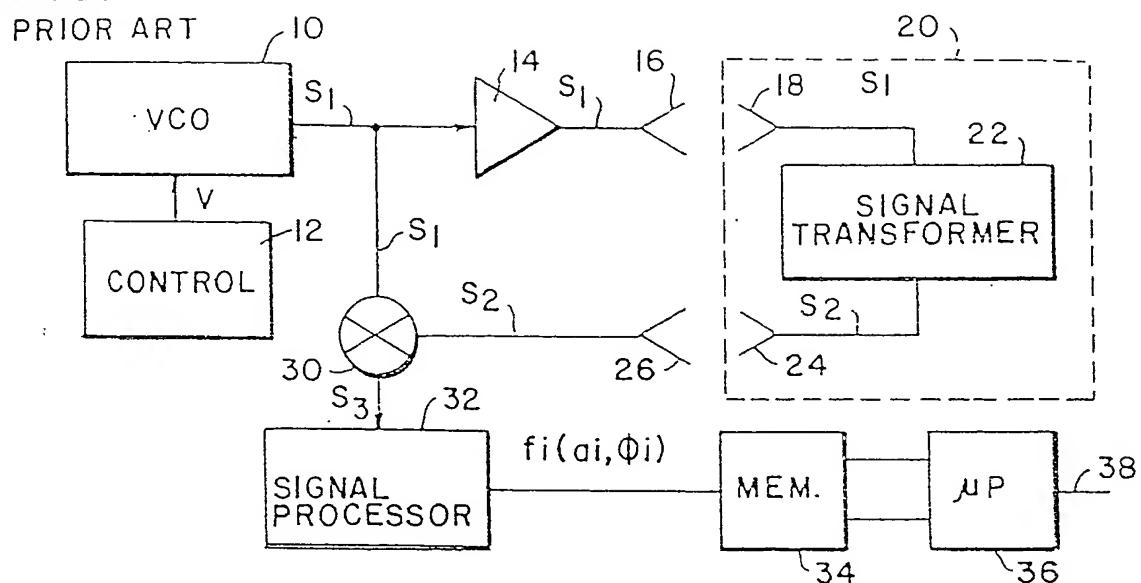


FIG.2

PRIOR ART

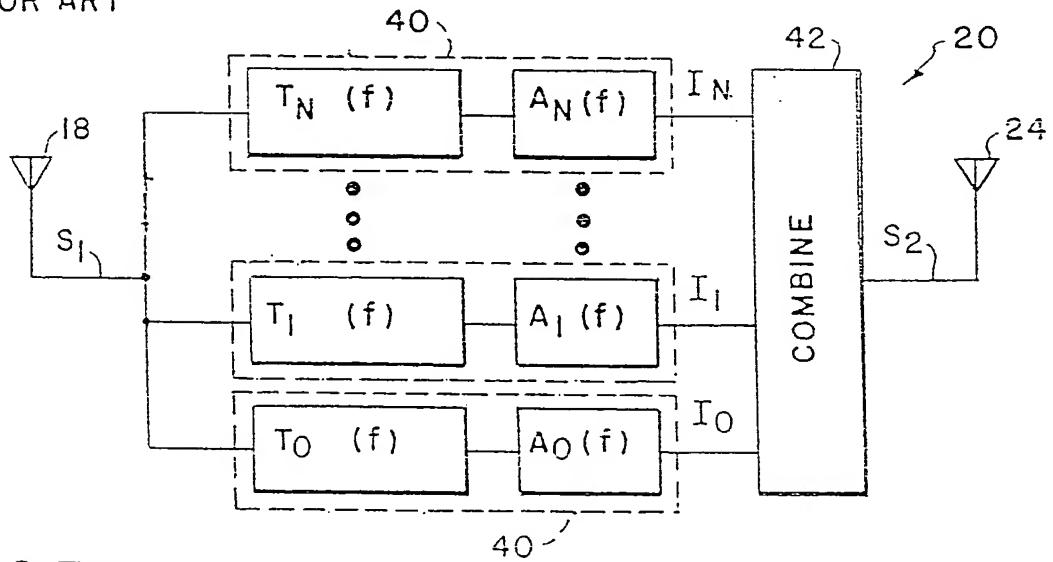


FIG.3A

PRIOR ART

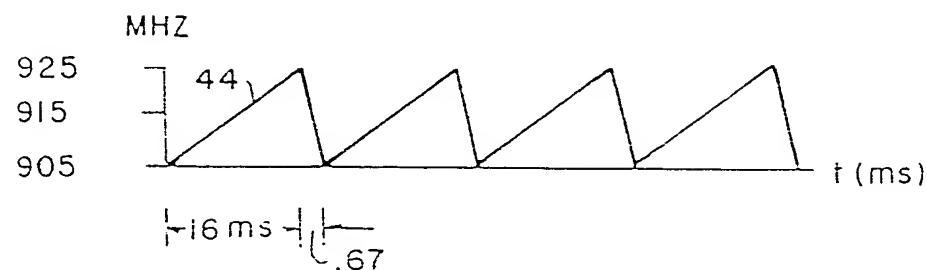


FIG. 3B
PRIOR ART

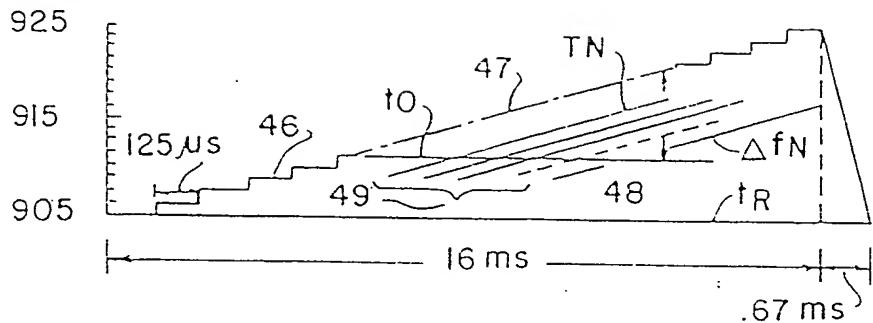


FIG. 4
PRIOR ART

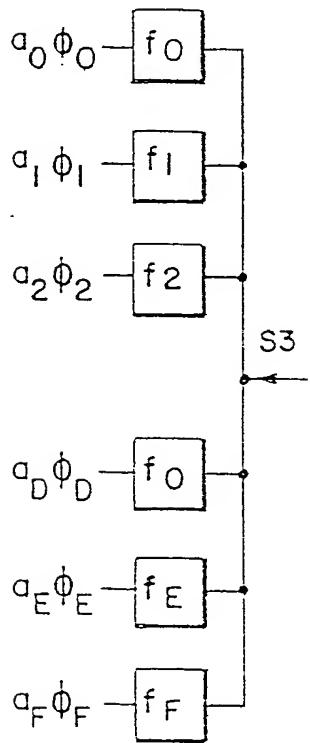


FIG.5 PRIOR ART

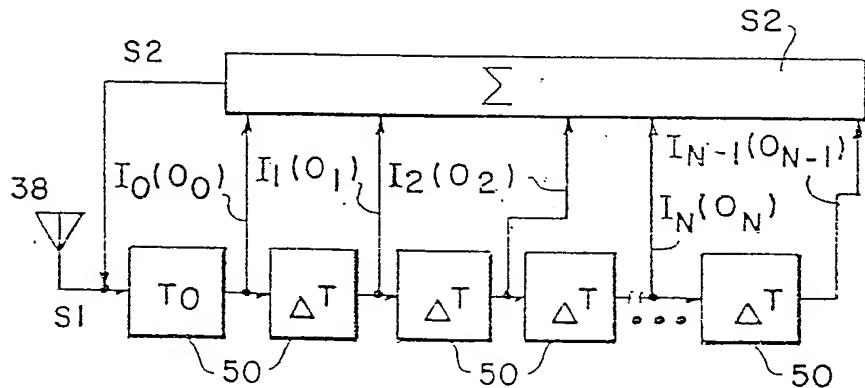


FIG.7 PRIOR ART

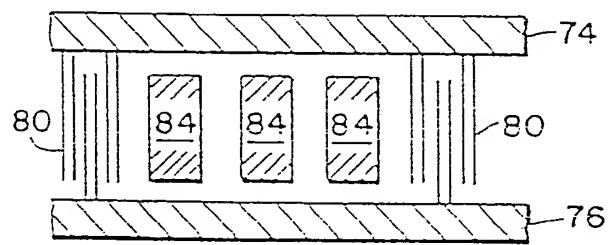


FIG. 6 PRIOR ART

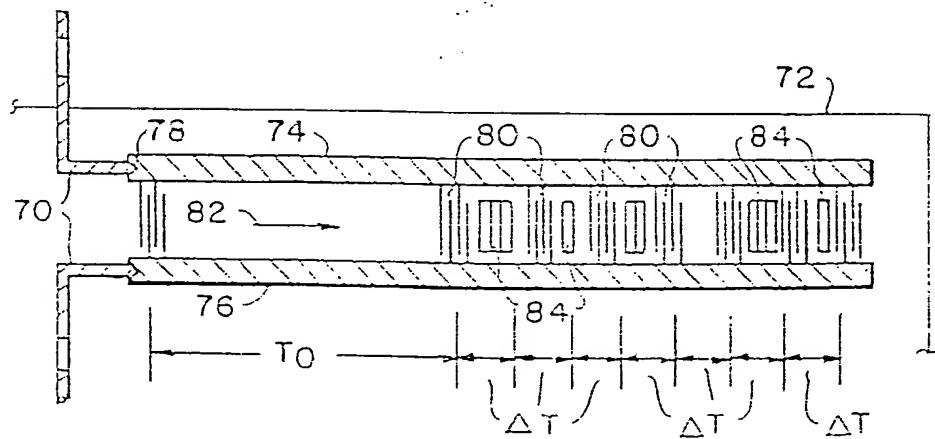


FIG.8A

PRIOR ART

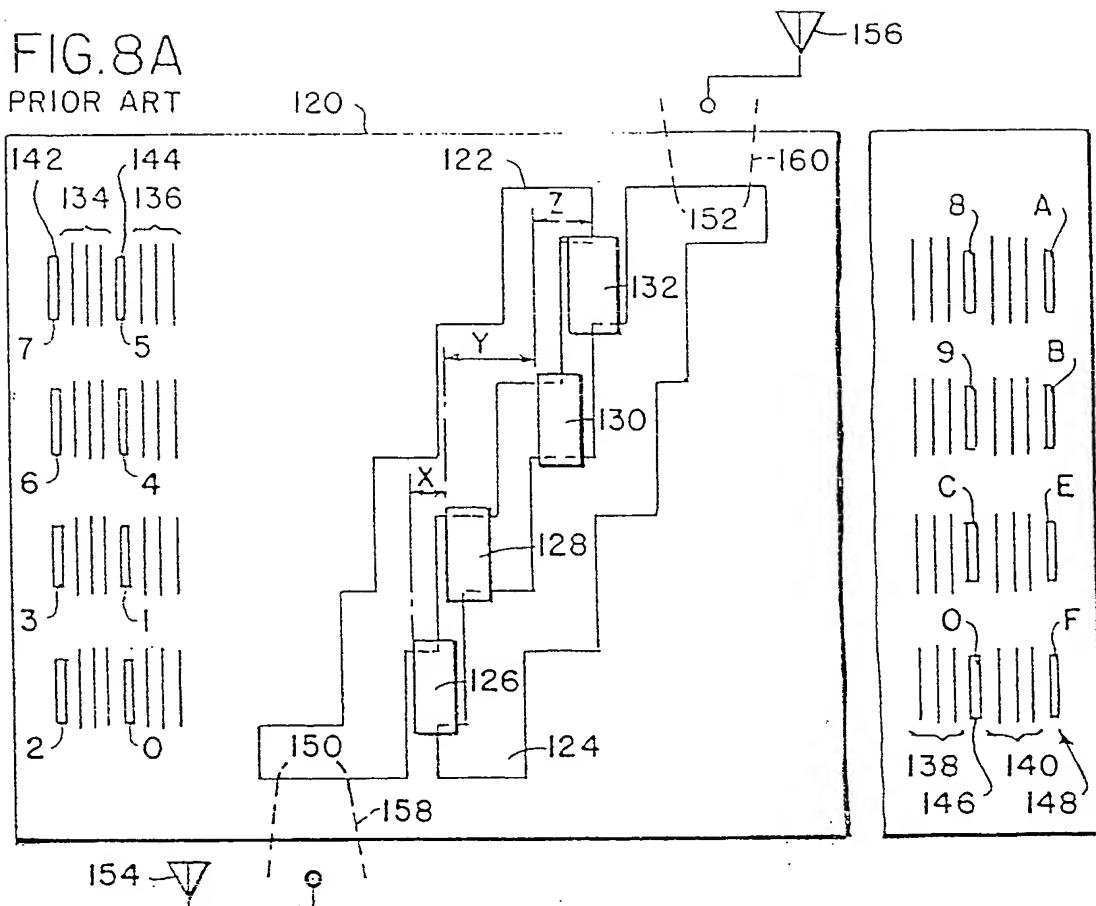


FIG.8B

PRIOR ART

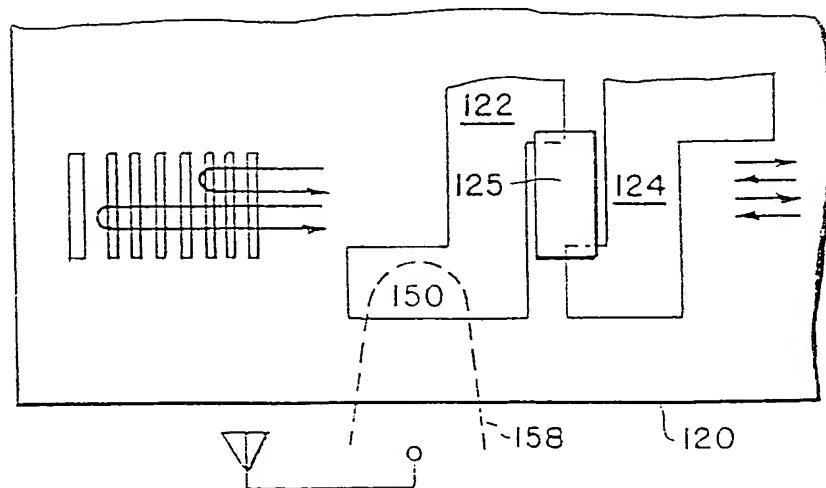


FIG. 9A

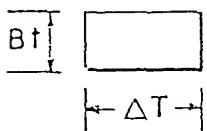


FIG. 9B

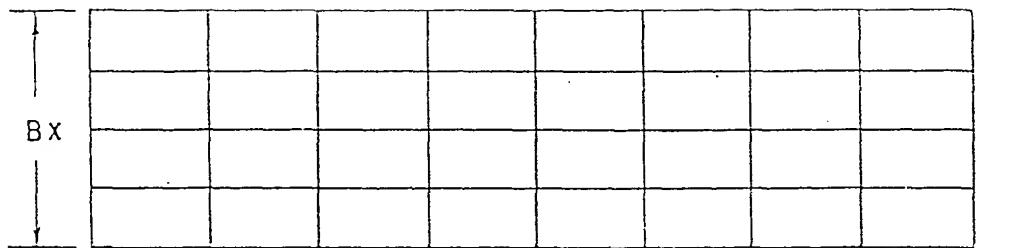


FIG.9C

TF INFORMATION CELL DISTRIBUTED OVER TIME AND FREQUENCY TI

$$T_1 - T_f$$

الآن

3 μ s

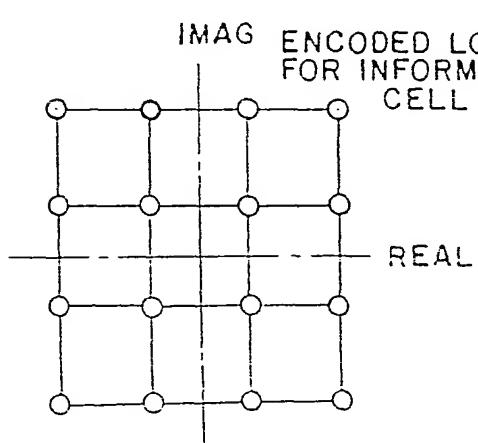
10

23μs

902MHz

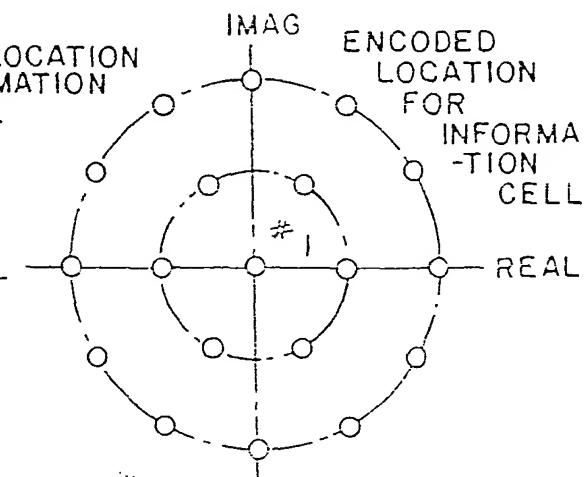
INFORMATION CELLS DISTRIBUTED OVER TIME ONLY

FIG.10A



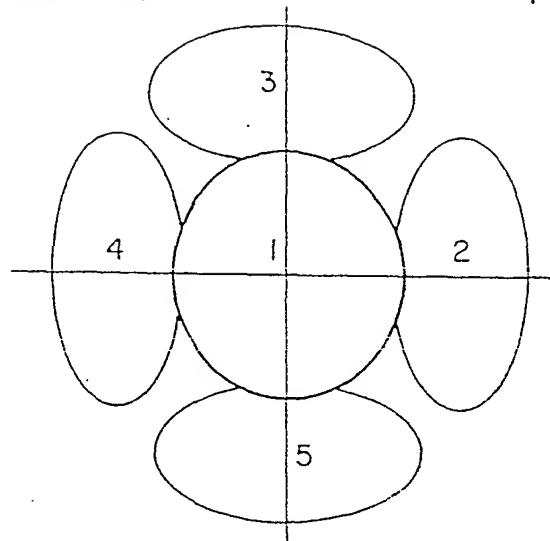
QAM (16) ENCODING RECTANGULAR MODULATION

FIG. 10B



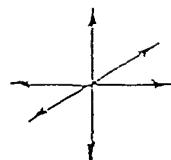
#1 CELL NOT USED
Q AM (18) ENCODING
POLAR MODULATION
(BETTER SUITED SAW APPLICATION)

FIG.IIA



BEAM PATTERN COVERAGE USING PATCH
LIKE ANTENNA (PROJECTION VIEW)

FIG.IIB



POLARIZATION AXES
POLARIZATION COVERAGE

SPATIAL DISCRIMINA
-TION MULTI-READ
POINTS
SPATIAL COVERAGE

FIG.IIC

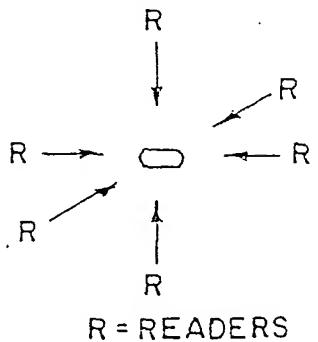
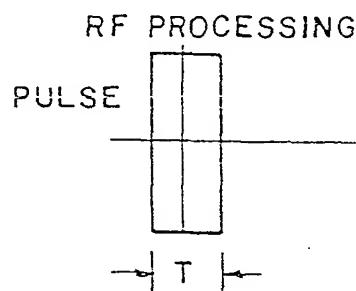


FIG.I2A



R = READERS

FIG.I2B

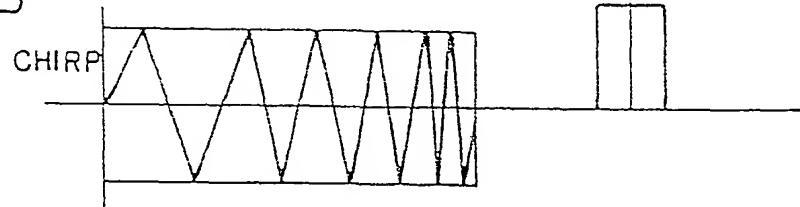


FIG.I2C

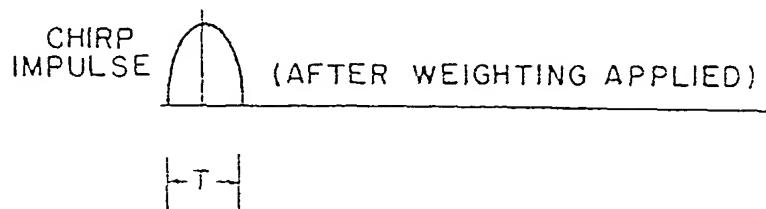


FIG.12D

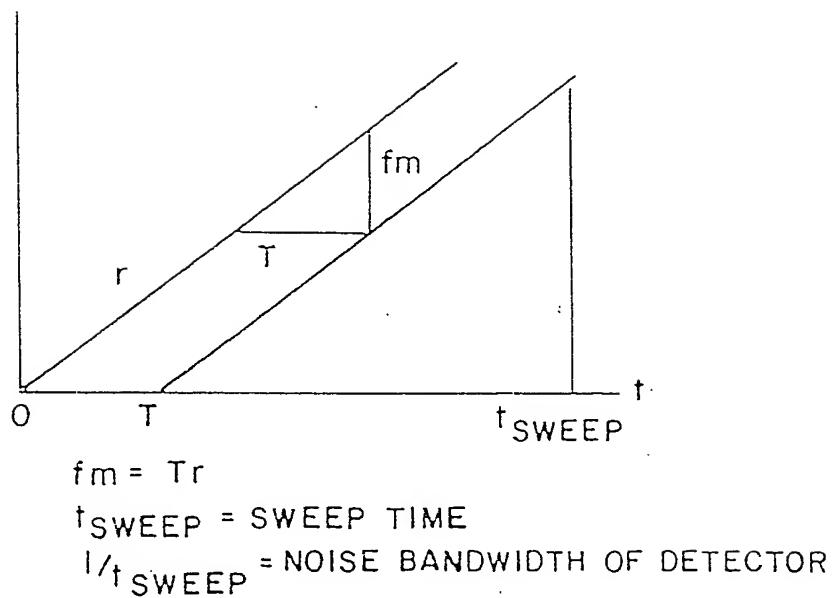


FIG.13

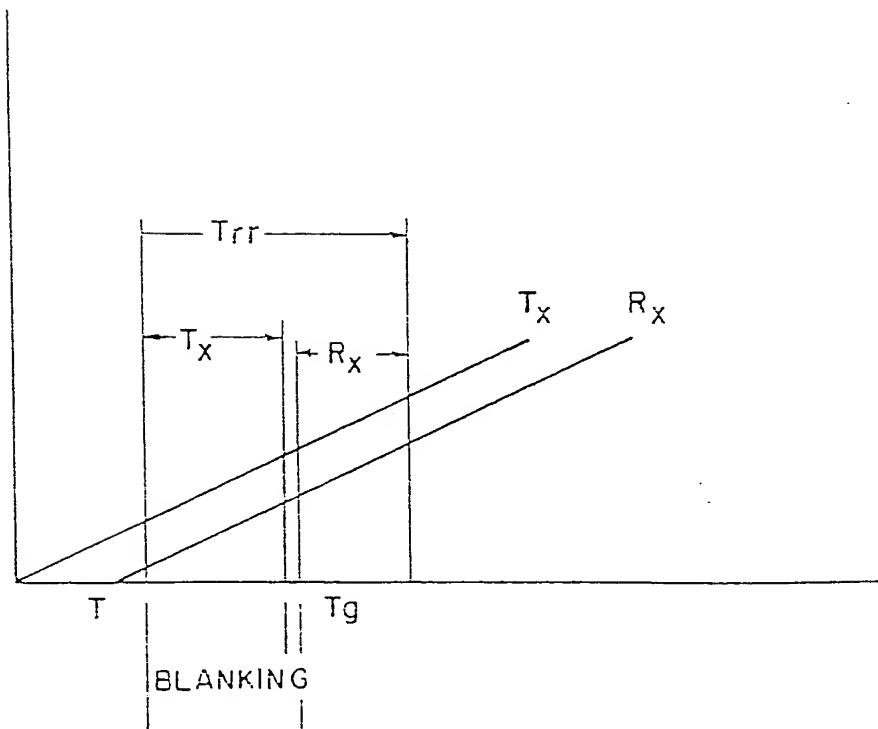
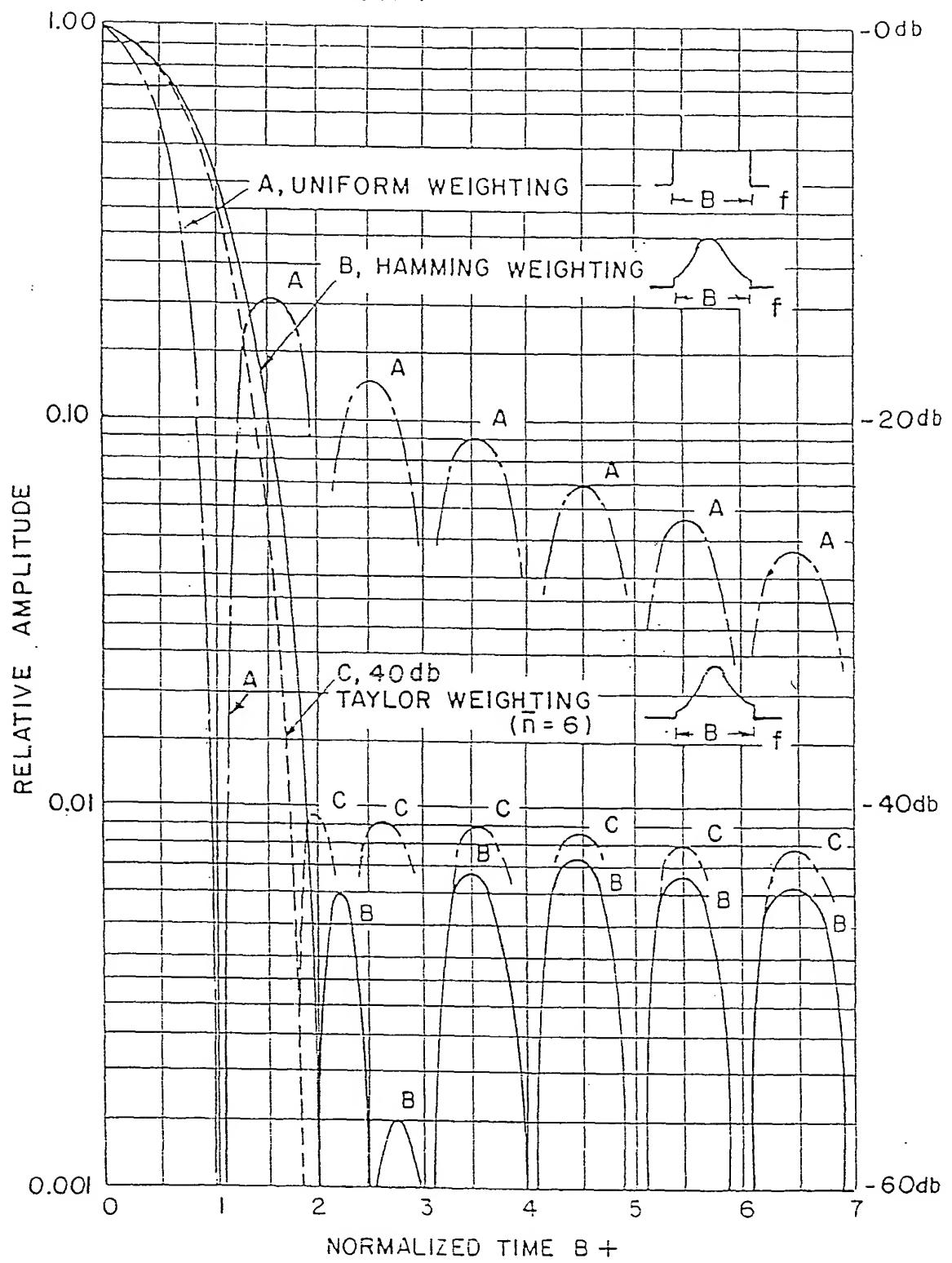


FIG.14



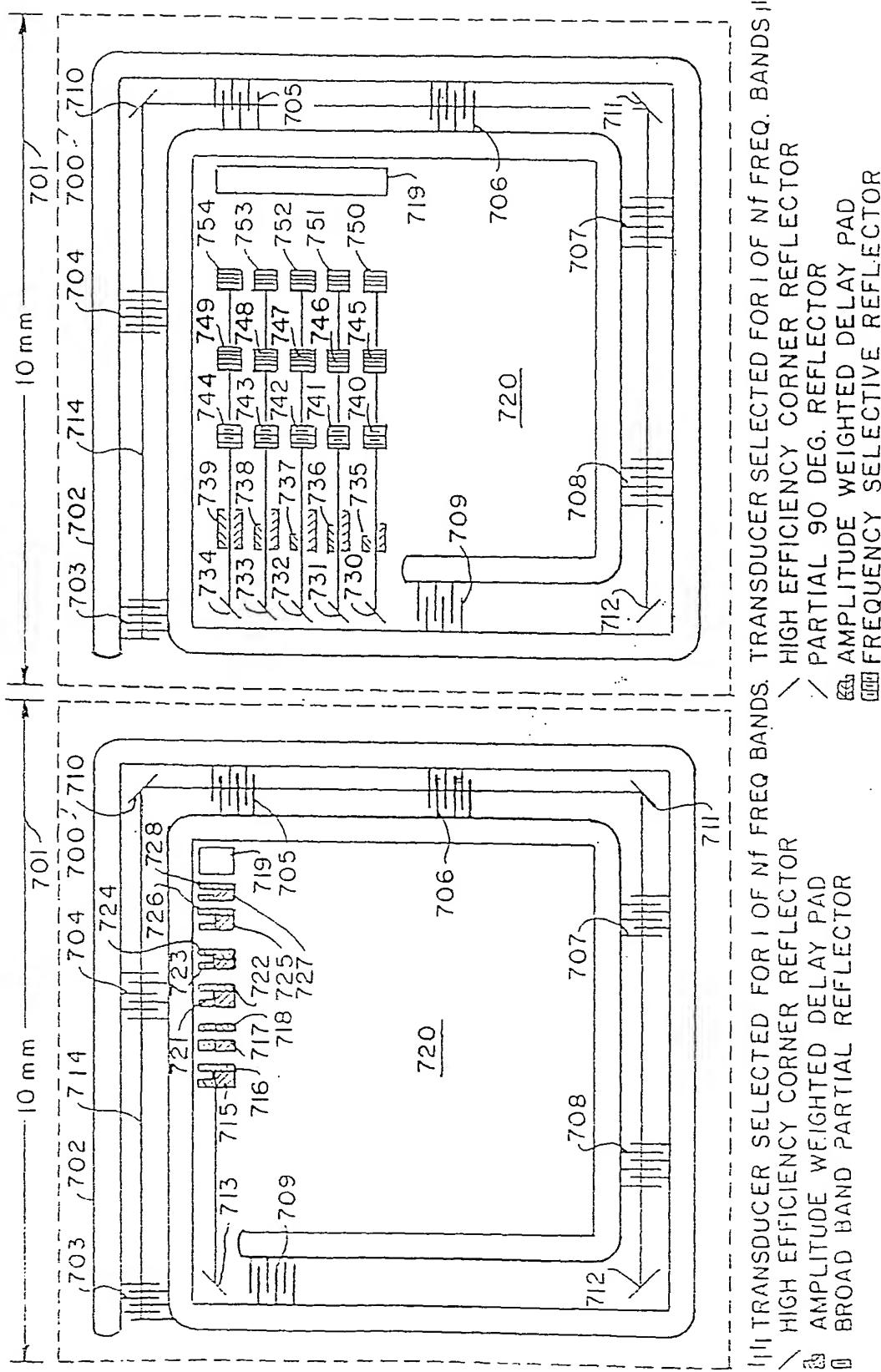


FIG.15

FIG.16

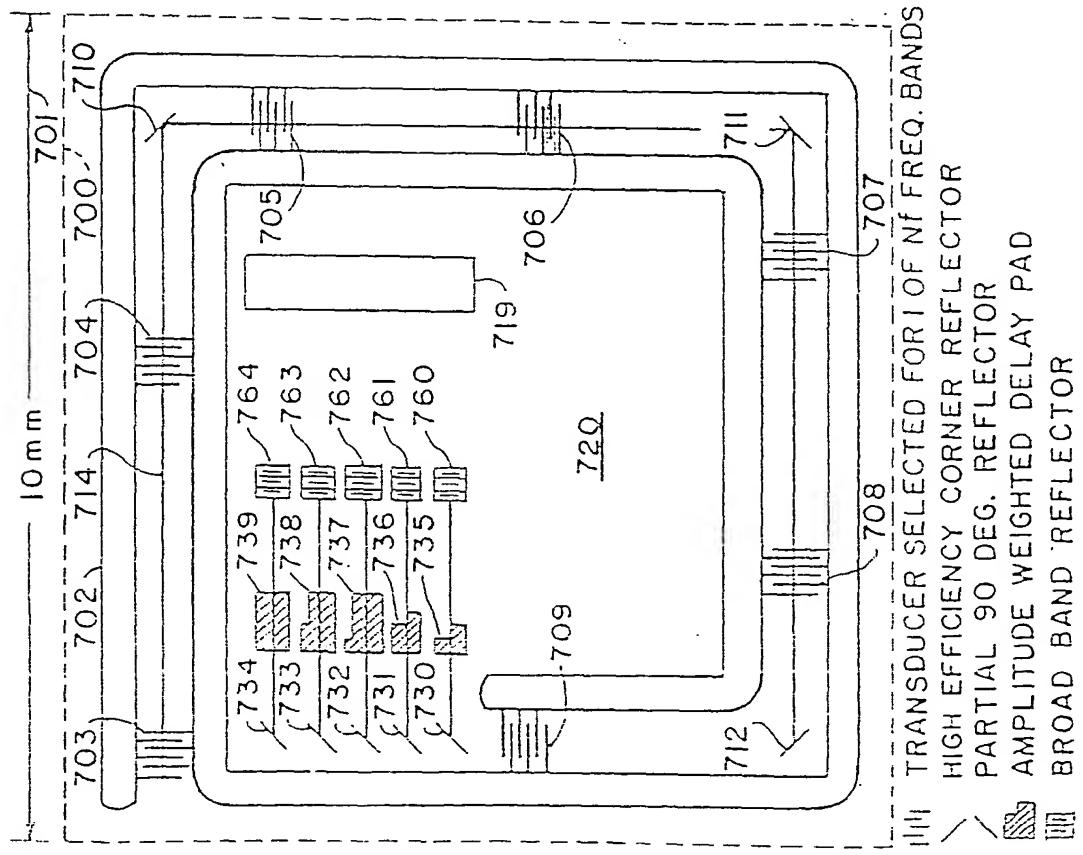


FIG. 17

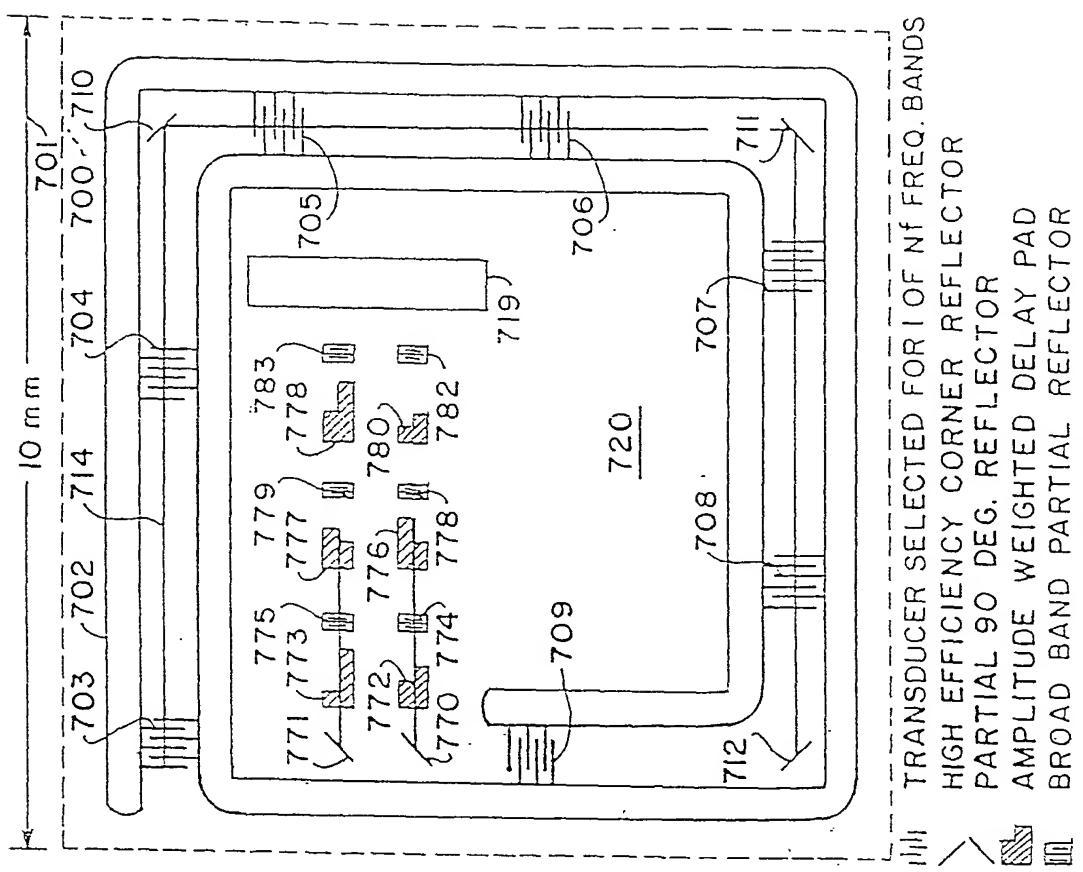


FIG. 18

FIG.19A

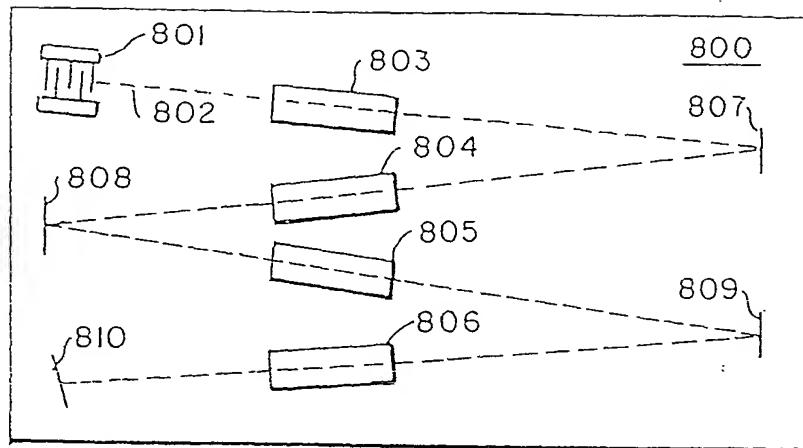


FIG.19B

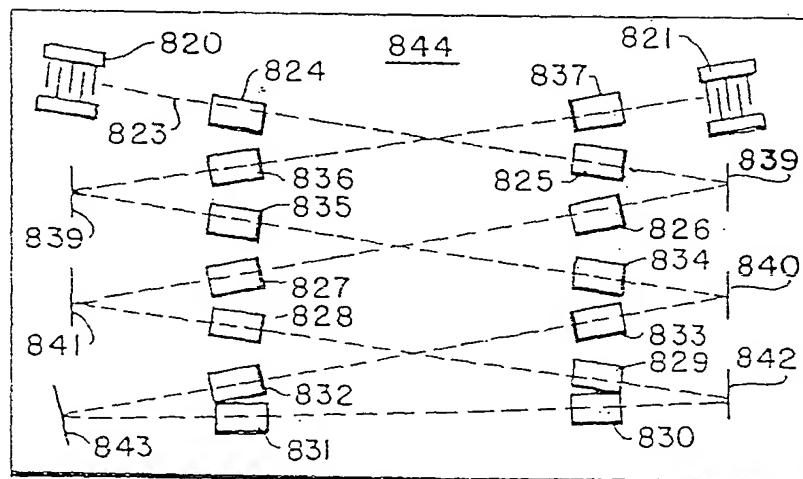
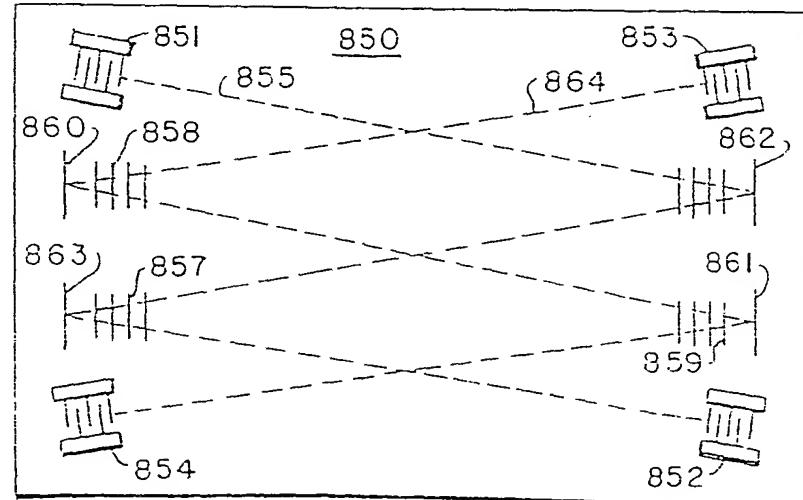


FIG.19C



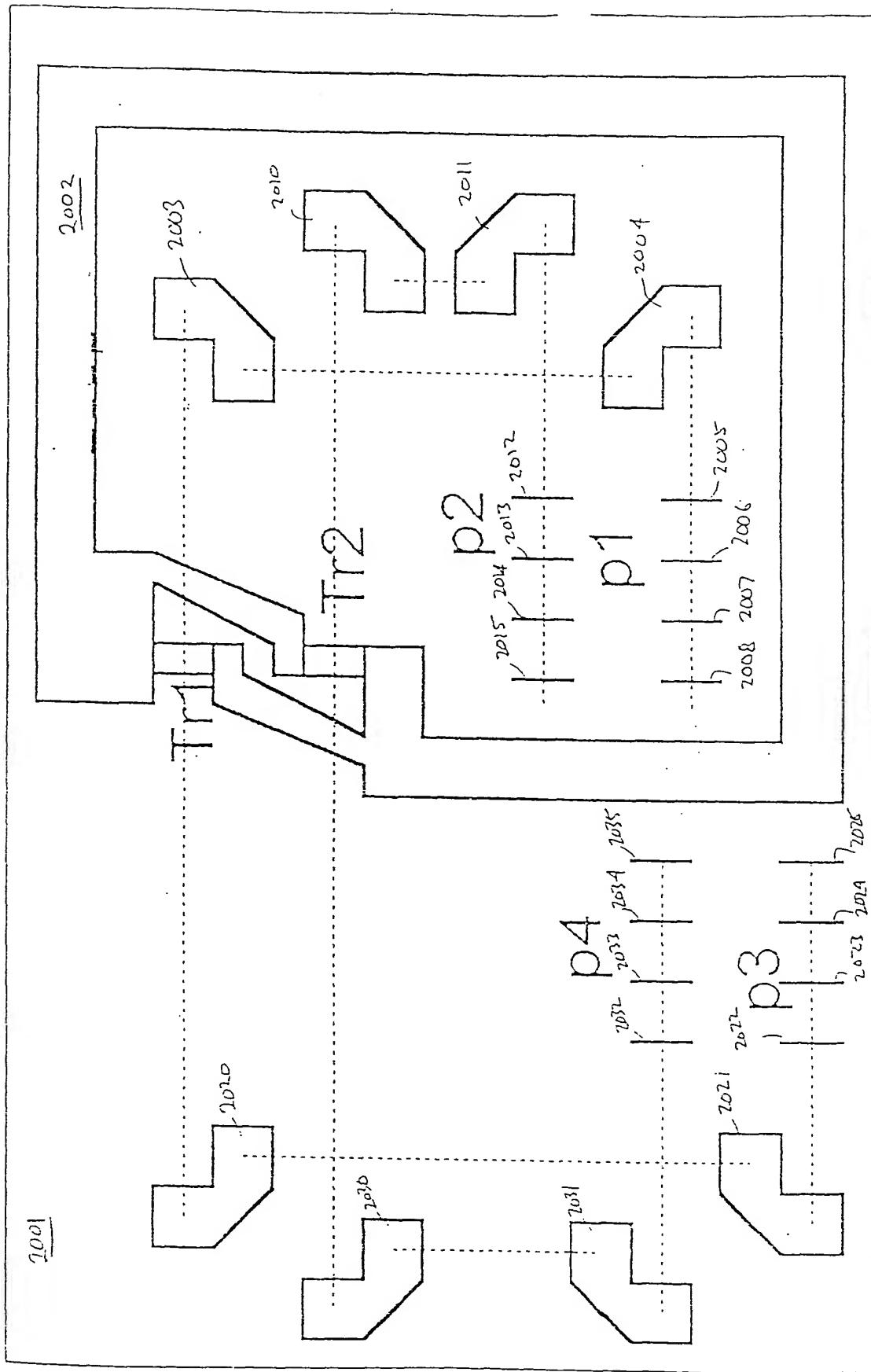


Fig. 20

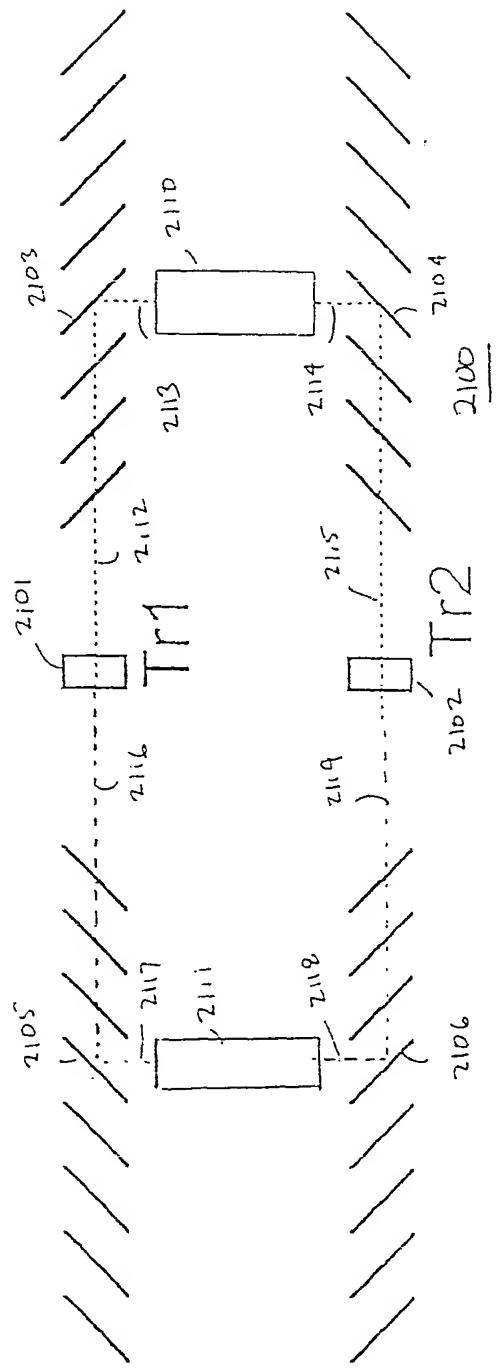


Fig. 21

Calculation of element reflection and resultant loss per tap (excluding transducer loss) for 16 tap RAC. (8 taps on each side of transducers)

Parameters : top = prop. loss between taps (200 ns delay)

rsp0 = refl. coeff. of 1st tap (one RAC element)

rl0 = prop. loss of 1st tap (1us delay)(dB)

$$\text{top} := 0.977$$

$$\text{rp}_0 := 0.04$$

$$\text{rl}_0 := 1.0$$

$$\text{rsp}_0 := \sqrt{\text{rp}_0}$$

$$i := 1..7$$

$$\text{rp}_i := \frac{\text{rp}_{i-1}}{1 - \text{rp}_{i-1}} \cdot \frac{1}{\text{top}}$$

$$\text{rl}_i := (1 - \text{rp}_i) \cdot \text{top} \cdot \frac{\text{rp}_i}{\text{rp}_{i-1}}$$

$$\text{rsp}_i := \sqrt{\text{rp}_i}$$

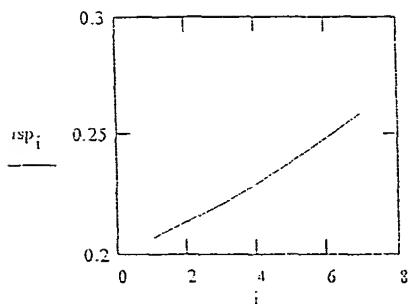
$$\text{rsp} = \begin{bmatrix} 0.2 \\ 0.207 \\ 0.214 \\ 0.221 \\ 0.229 \\ 0.238 \\ 0.248 \\ 0.259 \end{bmatrix}$$

$$\text{rl} = \begin{bmatrix} 1 \\ 0.997 \\ 0.997 \\ 0.997 \\ 0.996 \\ 0.996 \\ 0.995 \\ 0.994 \end{bmatrix}$$

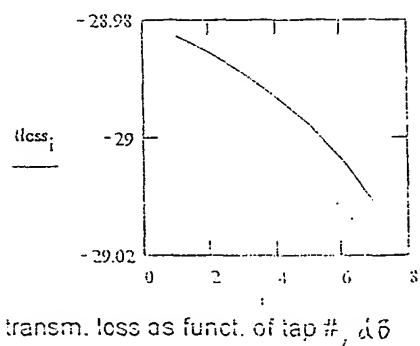
$$\text{tloss}_i := 20 \cdot \log(\text{rl}_i \cdot \text{rp}_0) - 1.0$$

$$\text{tloss}_0 := 20 \cdot \log(\text{rp}_0) - 1.0$$

$$\text{tloss} = \begin{bmatrix} -28.959 \\ -28.983 \\ -28.986 \\ -28.989 \\ -28.993 \\ -28.998 \\ -29.004 \\ -29.011 \end{bmatrix}$$



element reflection as funct. of tap #



transm. loss as funct. of tap #, dB

Fig. 22

Calculation of element reflection and resultant loss per tap (excluding transducer loss) for 16 tap RAC. (8 taps on each side of transducers)

Parameters : top = prop. loss between taps (200 ns delay)
 r_{p0} = refl. coeff. of 1st tap (one RAC element)
 r_{l0} = prop. loss of 1st tap (1us delay)(dB)

$$\text{top} := 0.977$$

$$r_{p0} := 0.0625 \quad r_{l0} := 1.0 \quad r_{sp0} := \sqrt{r_{p0}}$$

$$i := 1..7$$

$$r_{pi} := \frac{r_{pi-1}}{1 - r_{pi-1}} \cdot \frac{1}{\text{top}} \quad r_{li} := (1 - r_{pi}) \cdot \text{top} \cdot \frac{r_{pi}}{r_{pi-1}} \quad r_{sp_i} := \sqrt{r_{pi}}$$

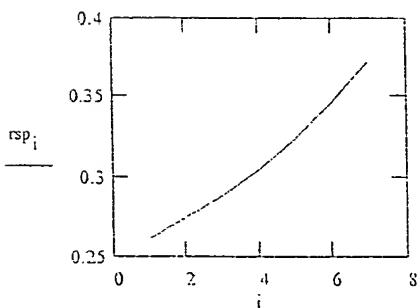
$$r_{sp} = \begin{bmatrix} 0.25 \\ 0.261 \\ 0.274 \\ 0.288 \\ 0.304 \\ 0.323 \\ 0.345 \\ 0.372 \end{bmatrix}$$

$$rl = \begin{bmatrix} 1 \\ 0.994 \\ 0.993 \\ 0.991 \\ 0.989 \\ 0.987 \\ 0.983 \\ 0.978 \end{bmatrix}$$

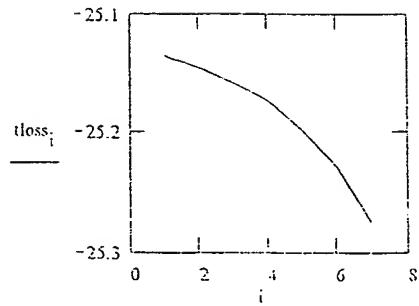
$$tloss_i := 20 \cdot \log(r_{li} \cdot r_{p0}) - 1.0$$

$$tloss_0 := 20 \cdot \log(r_{p0}) - 1.0$$

$$tloss = \begin{bmatrix} -25.082 \\ -25.136 \\ -25.145 \\ -25.158 \\ -25.174 \\ -25.197 \\ -25.228 \\ -25.275 \end{bmatrix}$$



element reflection as funct. of tap #



transm. loss as funct. of tap #, dB

Fig. 23

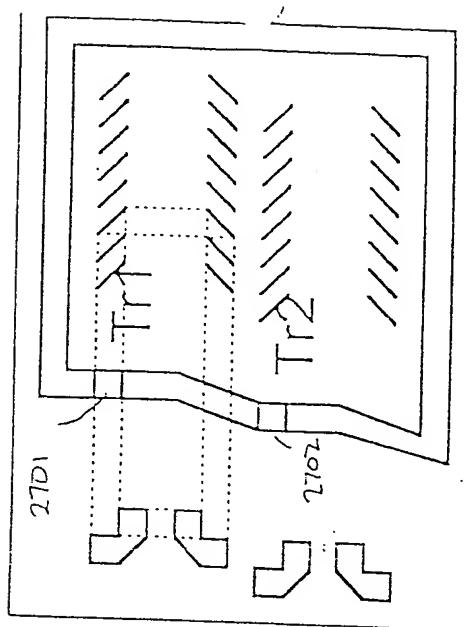


Fig. 27

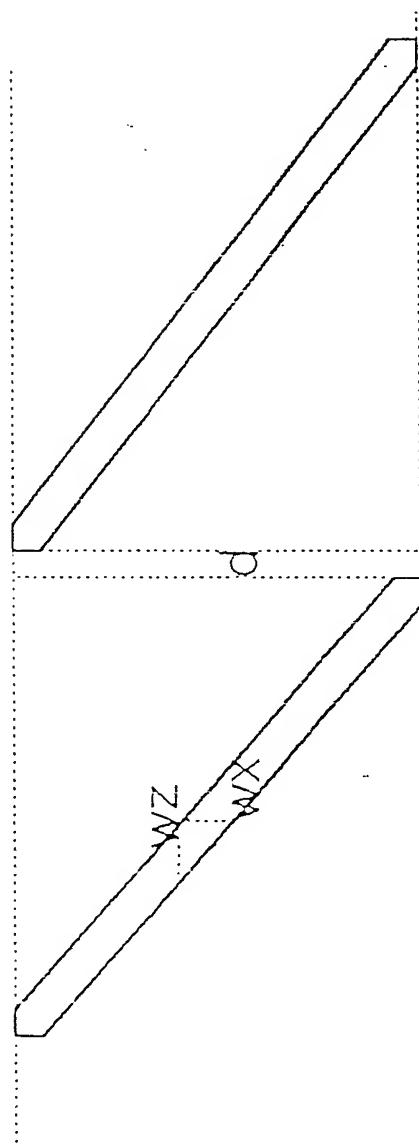


Fig. 24

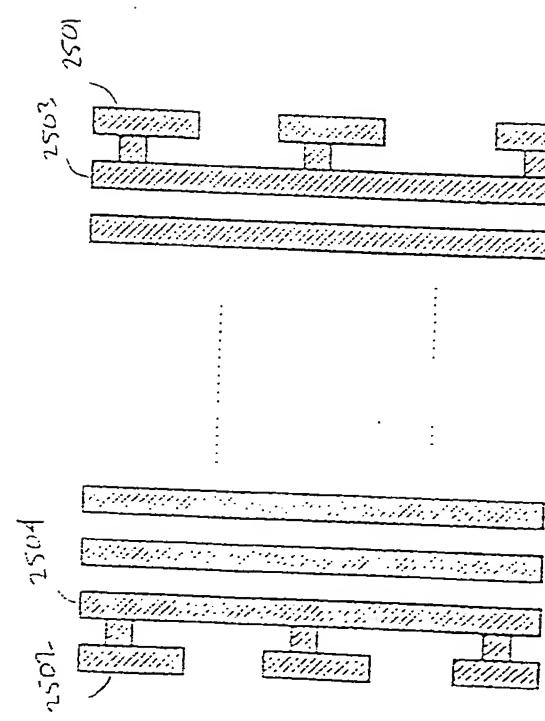


Fig. 25

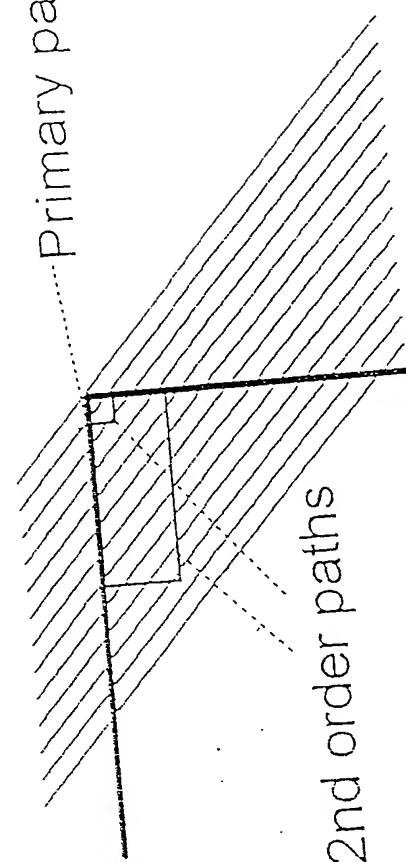


Fig. 26

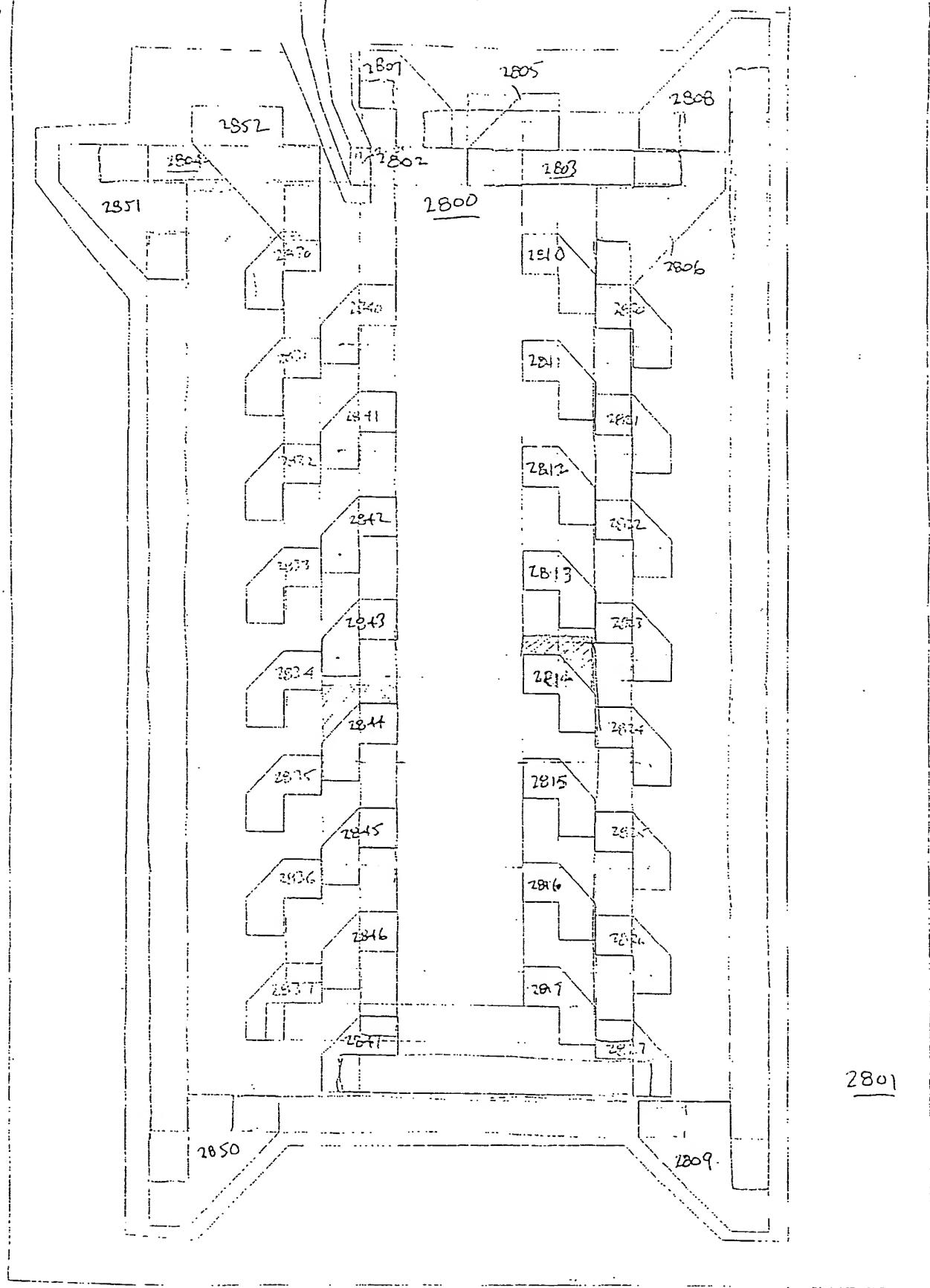


Fig. 28

Fig. 29.

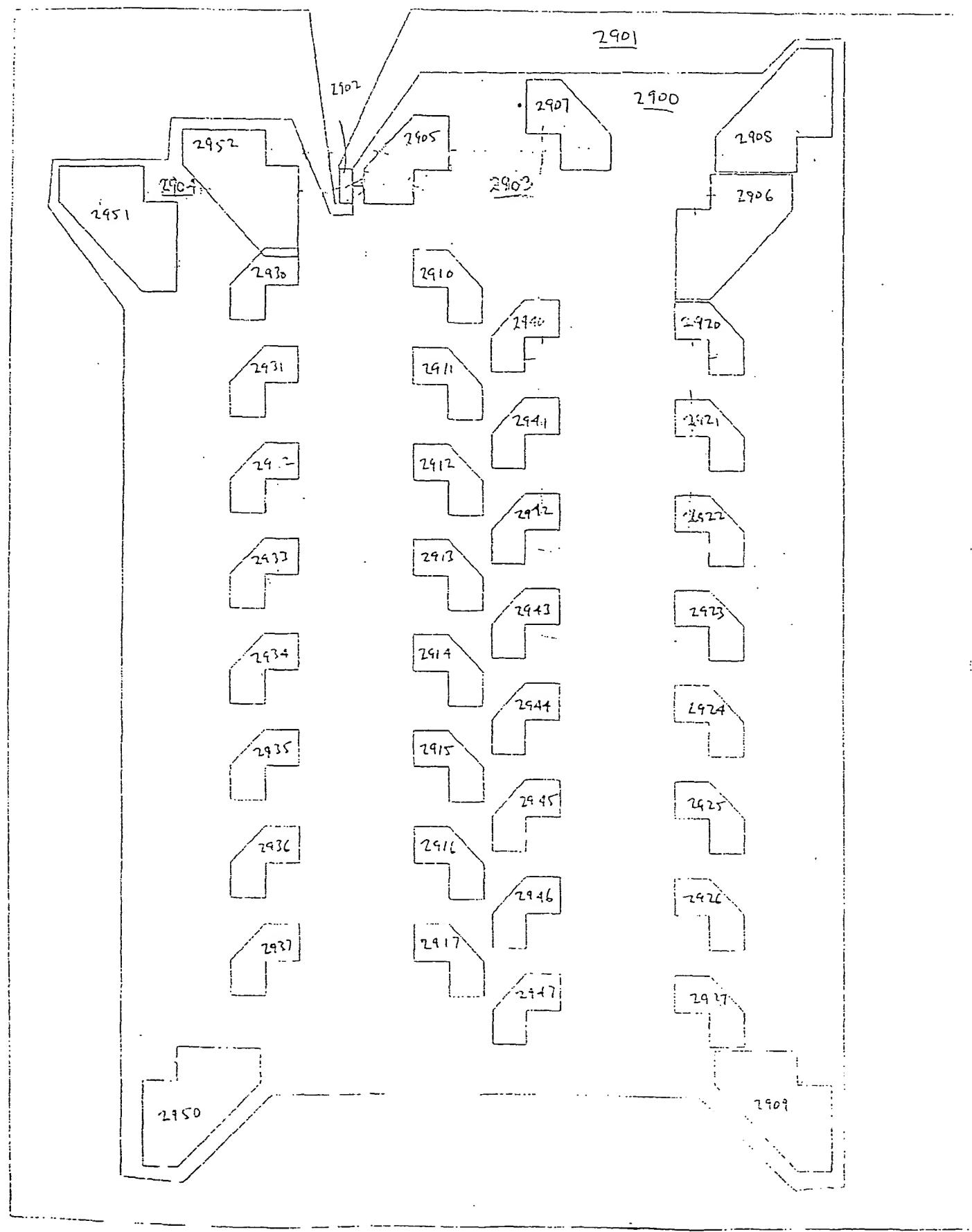
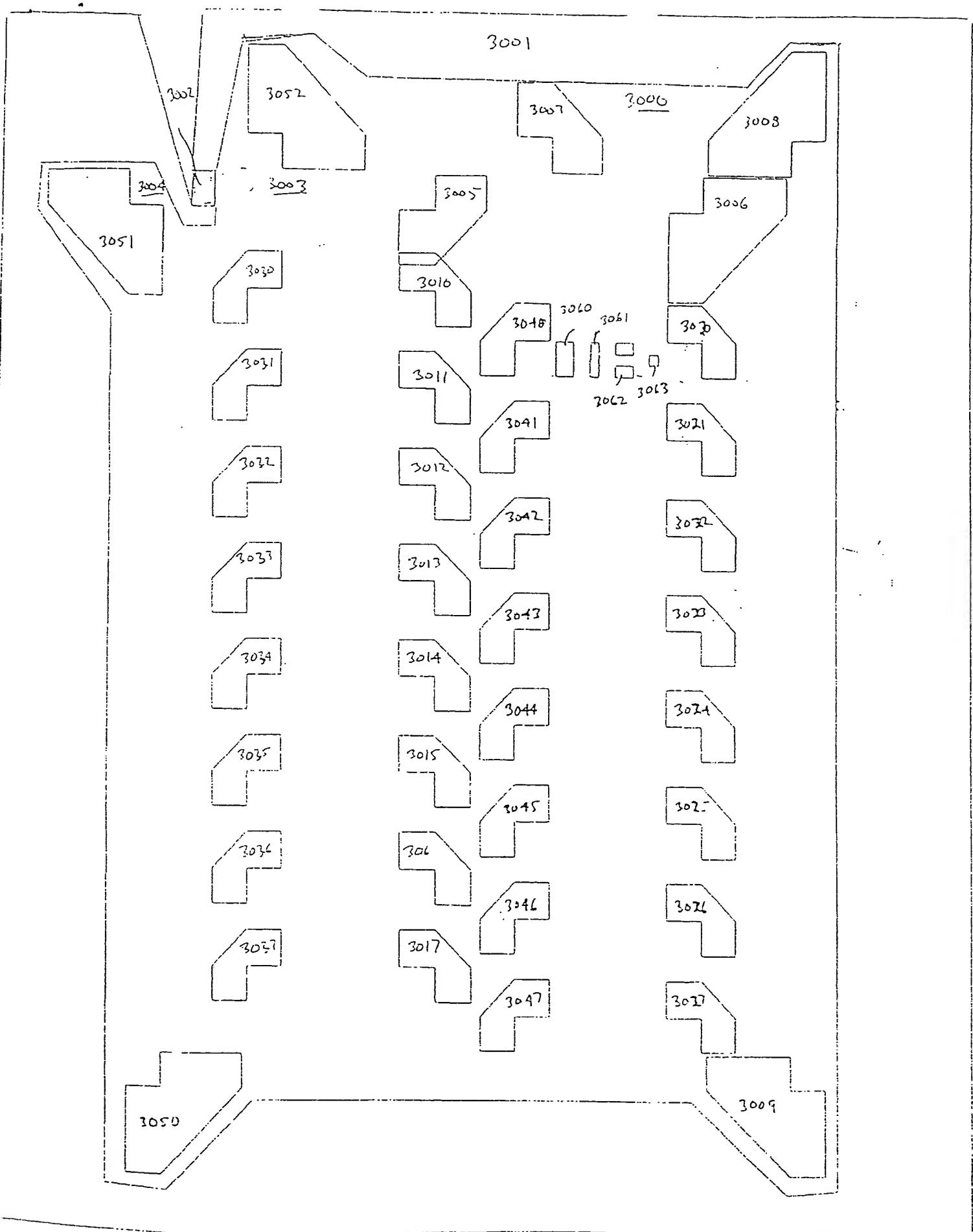


Fig. 30



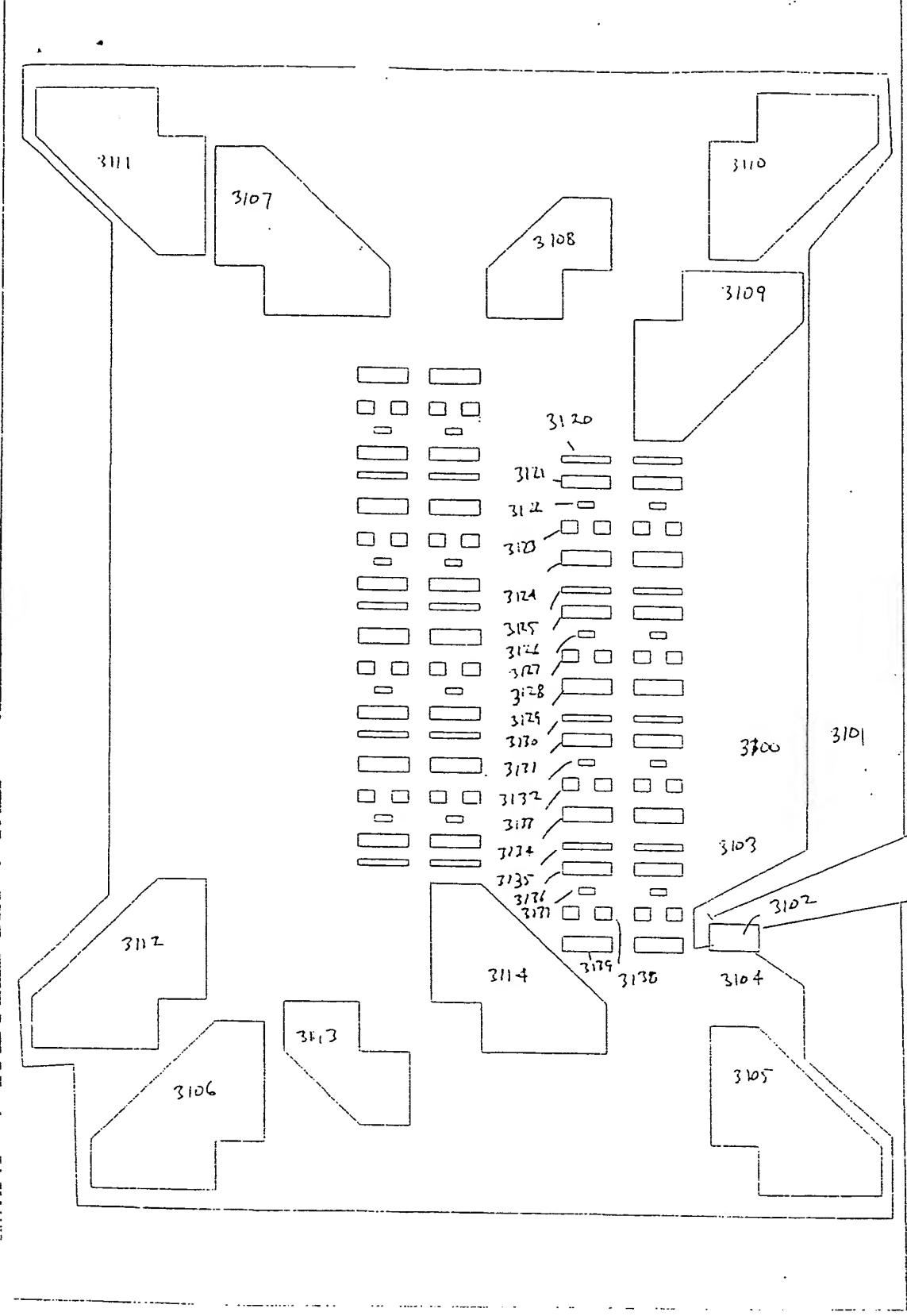


Fig. 31

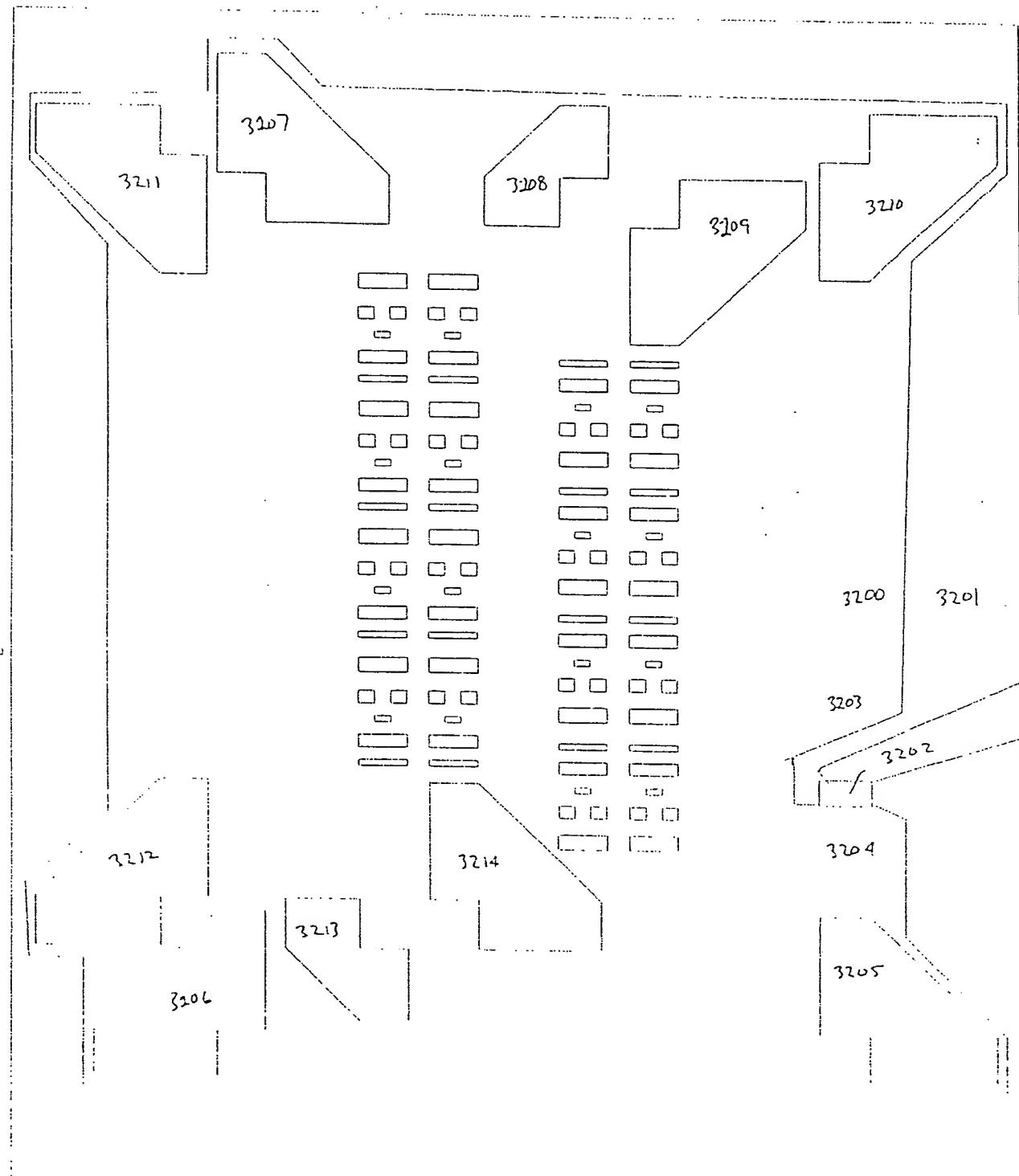


Fig. 32

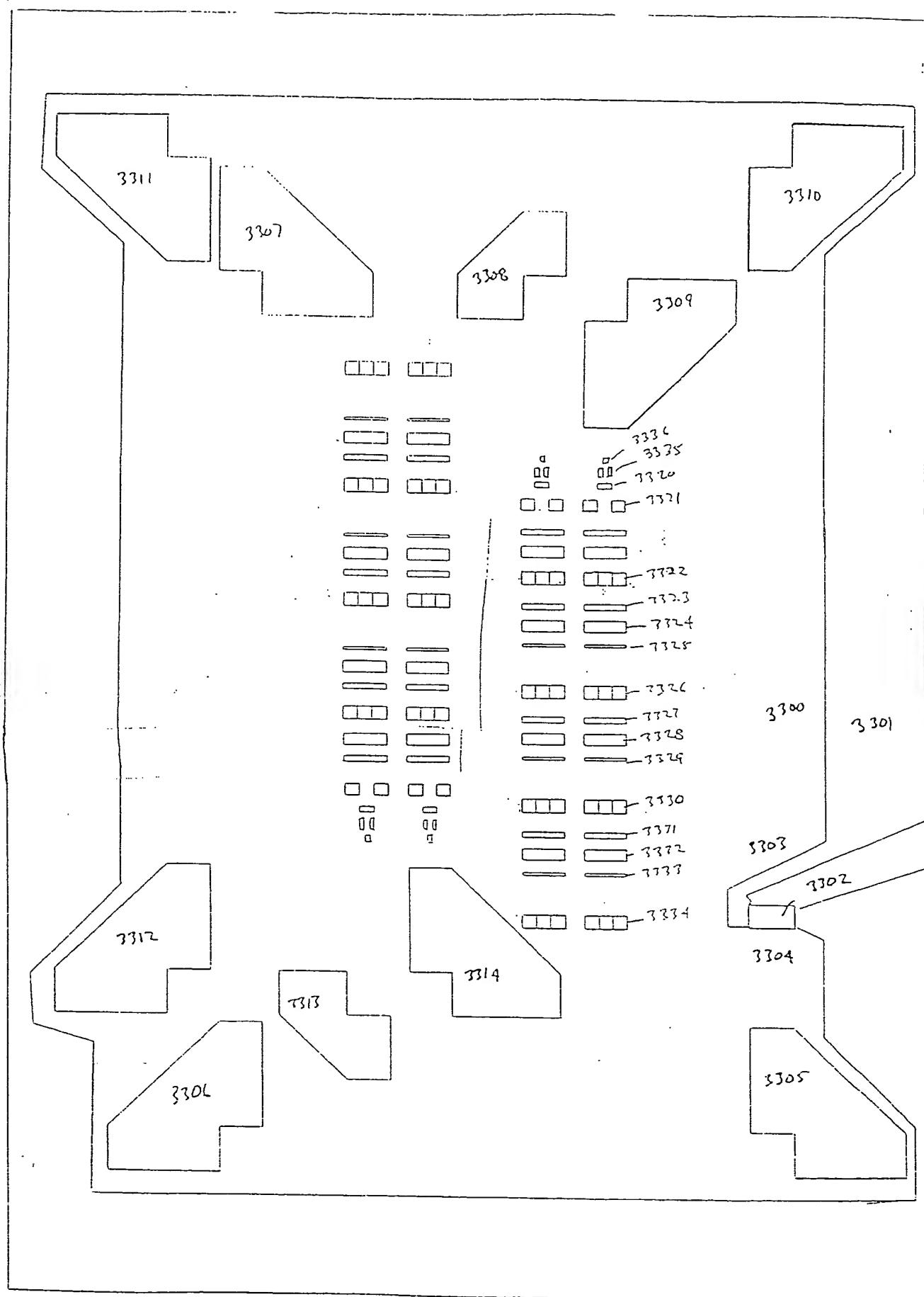
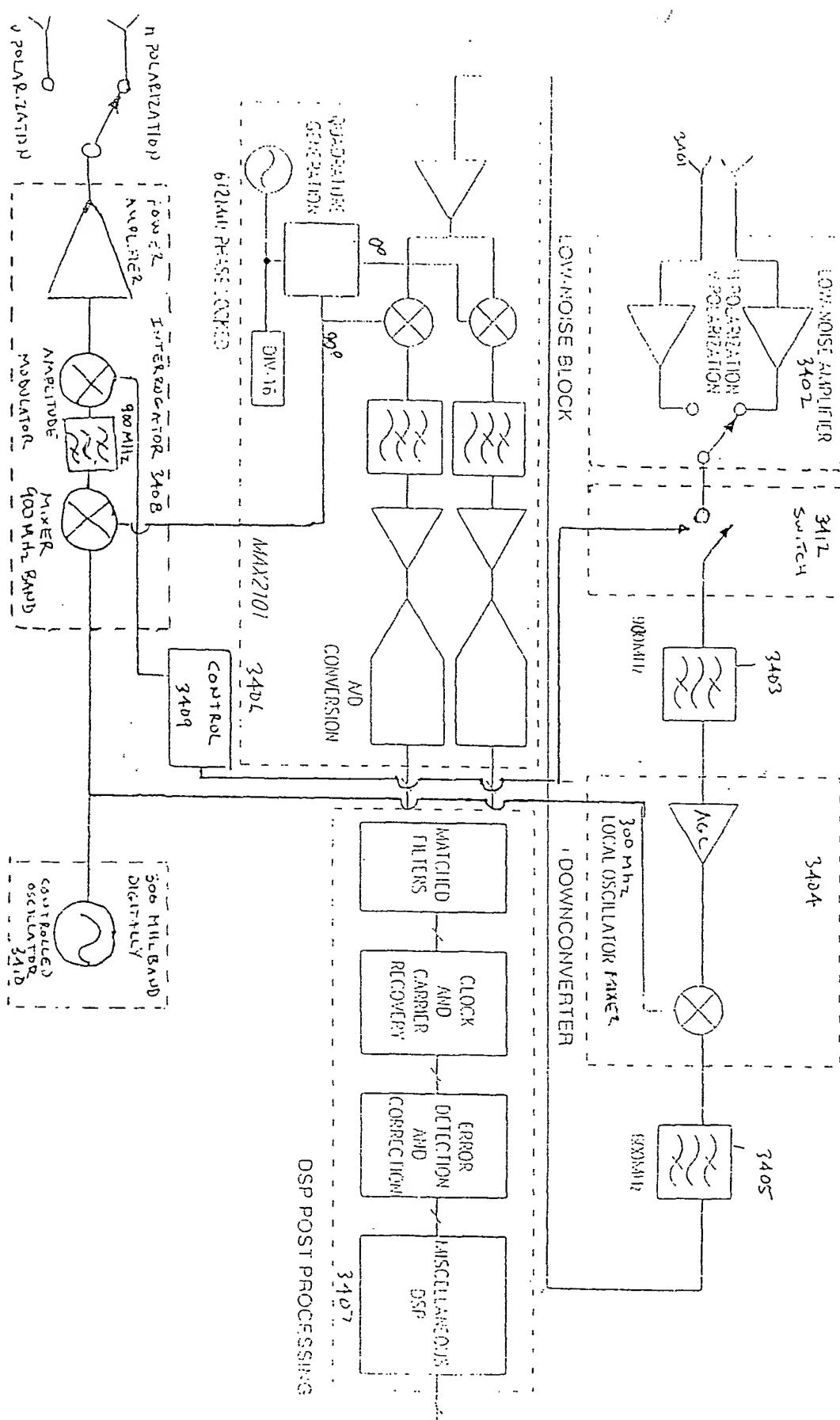


Fig. 33



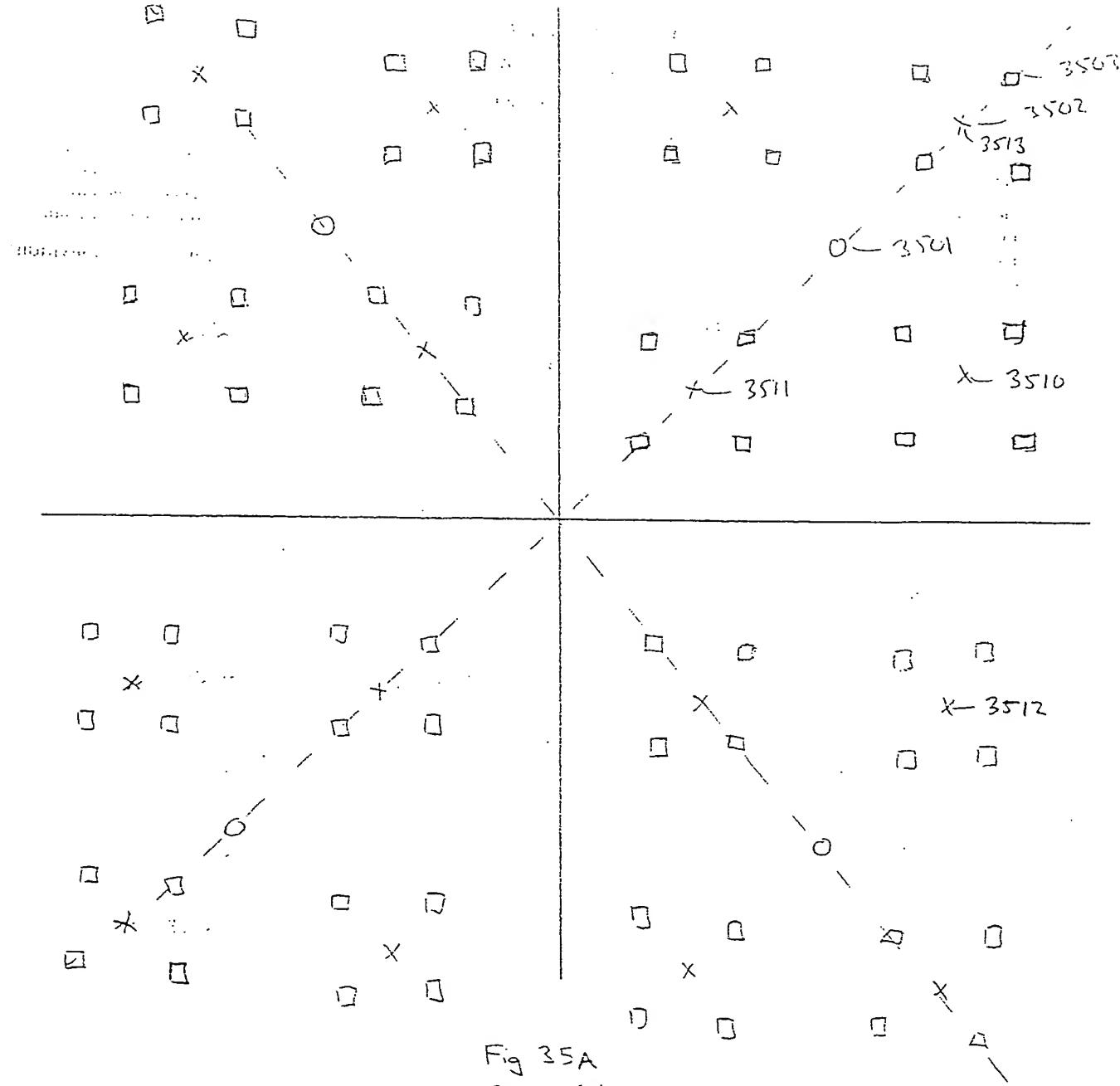
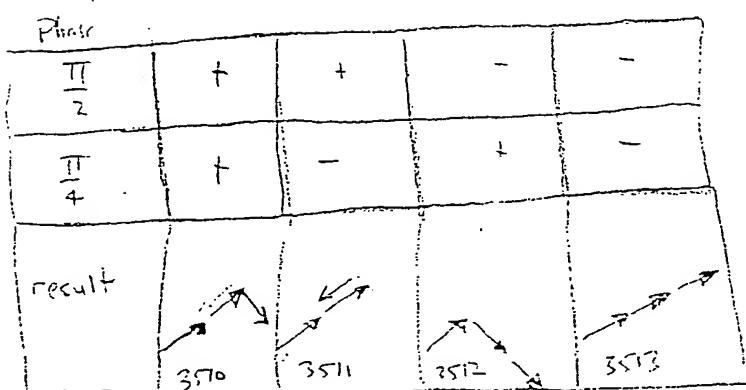


Fig 35A
QAM-64



Phase Splitting

Fig. 35B